AROUND THE LAB

Institute serves to forge new supercomputing frontiers

Editor's note: This is the last in a series of articles on the Lab's research institutes. Today's article looks at the Institute for Scientific Computing Research.

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NEWSLINE STAFF WRITER

The main offices for the Lab's Institute for Scientific Computing Research are located just down the hall from the world's most powerful supercomputer. That proximity is proving to be a powerful lure for computer scientists, professors and students from around the country, offering them unparalleled research opportunities.

"There is no other game in this country quite like this in terms of supercomputing," said David Keyes, acting director of the ISCR. "The ASCI computer represents a new class of hardware and software; that's the challenge to scientists. We have to study the machine and create the software to run it. It didn't come with shrink-wrapped scientific software.

"We're helping IBM to understand the implications of the architecture of their own machine. As a result, a lot of computer scientists are interested in working with us," he added.

Jointly operated by the University Relations Program and the Center for Applied Scientific Computing, the institute is the primary link between the Lab and university collaborators, students and postdocs.

"The ISCR serves a vital role in coupling university collaborators with a core part of the Laboratory," said Harry Radousky, acting director of the University Relations Program.

Founded in 1986, the ISCR is one of the University Relations Program's five institutes, which together form a centerpiece of the Lab's research collaborations with universities. The other institutes are the Center for Accelerator Mass Spectrometry, the Materials Research Institute, the Institute for Geophysics and Planetary Physics and the Institute for Laser Science and Applications.

About three years ago, the institute was joined with CASC, Radousky said. CASC serves the programmatic needs for high-end computing research and development, while the institute bridges the Laboratory with the academic community through collaborative research projects, visiting faculty, student internships, workshops and an active seminar series. ISCR's research participants work closely with the Lab's CASC scientists in addressing computational challenges at the Laboratory, Keyes said.

"It's remarkable over the past few years how the institute has blossomed from a small set of interactions to a wide ranging set of collaborations involving some of the best computational scientists from around the world," said Steve Ashby, director of CASC.

JOSEPH MARTINEZ/TID

David Keyes

Keyes had been an ISCR faculty participant since 1997 and came on board half time as the acting director in 1999. He divides his time between the Laboratory and Old Dominion University in Norfolk, Va., where he is chairman of the math and statistics department and an adjunct professor of computer science. In addition, he is also an associate research fellow at the NASA Langley Research Center.

"It's somewhat of an awkward lifestyle," he conceded, "but it's so exciting to be part of the institute and working with ASCI."

The institute aims to be the "eyes and ears" of the Lab in computational science by keeping aware of and connected to important external advances, he said. It also attempts to be the "feet and hands" in carrying those advances into the Lab and incorporating them into practice, Keyes said.

"It's a university chair's job to be aware of trends," he explained. "The Laboratory is subcontracting with me to be aware of what's out there, what's new and what should be tried here. It's a watchfulness function. 'Hands and feet' refers to bringing in faculty and their students."

Last summer, the institute sponsored 55 students in residence working with CASC scientists and expects to host about the same number this summer.

"The main thrust of the student program is recruitment. We want to make sure they have a positive experience at a national laboratory," Keyes said. "Here they can meet computing science experts that they might not meet at conferences."

As part of last year's summer program, the institute launched its Internships in Terascale Simulation Technology tutorial series, which featured two lectures per week for 10 weeks. Most of the speakers were Lab scientists, he added.

"We wanted to expose talented students to the Lab way of life," said Keyes, who was also one of the lecturers.

Three of the Lab lecturers, Alice Koniges, John May and Van Henson, had recently co-authored computational science books, he noted.

"The ISCR is the university outreach part of computing science," he added. "Until a few years ago, the institute sponsored a handful of postdocs and UCRD grants. Since ASCI took off, the program is now dominated by summer program visitors."

In the last fiscal year, the ISCR hosted 158 visitors to the Lab, who were primarily from academia, Keyes noted.

The institute also sponsored six workshops, including a "power programming" workshop last May that featured speakers from IBM, UC San Diego and Argonne National Laboratory.

"We do many of the projects here with Argonne. The two biggest and best computational science groups in the country are CASC and the math and computer science group at Argonne," he noted. In fact, Keyes collaborated with scientists from Argonne, NASA and Old Dominion on a simulation project that garnered a Gordon Bell Special Award in 1999.

The ISCR also inaugurated a distinguished lecture series last year, the ASCI Institute for Terascale Simulation Lecture Series, which featured the "deans of American computing science," Keyes said, including Peter Lax of the Courant Institute, Gilbert Strang of MIT, Frederick Brooks of the University of North Carolina, Burton Smith of the Tera Computer Co., and David Johnson of AT&T.

"It was a specialized version of the Director's Distinguished Lecturer Series, dedicated to computational science," he said.

This year's series began in January with a talk by Ingrid Daubechies of Princeton, who popularized wavelets, and will include talks in March by decorated computational astrophysicist Michael Norman (formerly an LLNL scientist) and in May by Gene Brooks, a computer security expert.

"We're talking to the 'who's who' of computational science and inviting them to come to the Lab for a day. I see them as future members of high-level advisory committees," Keyes said. "We invite them to speak at the Lab, offer them an immersive day here, and they come away with a good picture of the Lab behind the gates."

For more information about the institute, see the Web at http://www.llnl.gov/casc/iscr/

Status review confirms progress on the National Ignition Facility

Two positive steps have occurred over the last several months that highlight NIF progress

Late last week, Gen. Tom Giaconda, acting NNSA deputy administrator for Defense Programs (DP), signed the NIF Baseline Change Proposal for fiscal year 2001 for the National Ignition Facility (NIF).

The baseline change makes the NIF Project plan consistent with FY01 funding and moves some funds from fiscal years 2007 and 2008 forward into fiscal year 2003, but it does not change the total estimated cost of the project.

DP Status Review

Earlier this month, the Defense Programs (DP) Status Review of NIF found that NIF has made significant progress in all areas reviewed and is meeting its planned milestones within budget. These observations were underscored during a tour that highlighted the 1,000 tons of equipment that has been installed in NIF since the middle of last summer.

The review also found that an earned value system is in place and maturing. Earned value is a well-recognized process of tracking dollars planned and costed for work planned and performed. Requested in this year's congressional appropriations language, this new tool will assist the NIF project in tracking progress toward completion of the facility.

NIF personnel also presented a cost model for NIF operations after the facility is complete. The DP reviewers agreed that the operations cost model was reasonable and recommended continued updating as cost estimates mature.

More information and recent photos of NIF can be found on the NIF Website at www.llnl.gov/nif.